

**THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of:	:	Docket: PST 6366 P1US/2187
Martin HELLSTEN et al.	:	
	:	Group Art Unit: 1796
Serial No.: 10/520,491	:	
	:	Examiner: Daniel S. Metzmaier
Int'l Application No.: PCT/SE2003/001015	:	
Int'l Filing Date: June 17, 2003	:	Confirmation Number: 9838
	:	
For: A DRAG-REDUCING AGENT FOR USE	:	
IN INJECTION WATER AT OIL RECOVERY	:	

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**AMENDMENT AND RESPONSE**

Dear Sir:

This is in response to the Notice of Non-Compliant Amendment mailed July 21, 2010. In response to the Advisory action mailed on July 21, 2010, applicants attach hereto a copy of a Petition to the Commissioner which is being filed on even date herewith.

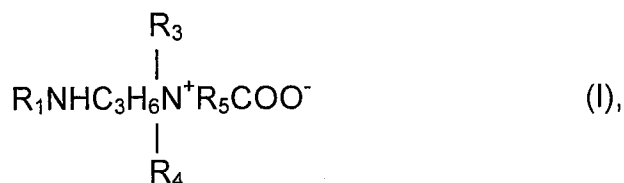
**Amendments to the Claims** being on page 2 of this paper.

**Remarks** being on page 7 of this paper.

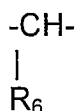
**Amendments to the Claims:**

1. (Previously Presented) A drag-reducing agent containing

a) a zwitterionic surfactant of the formula

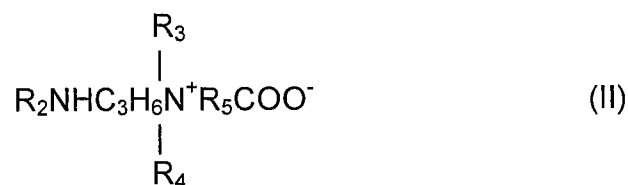


where  $\text{R}_1$  is acyl group with 12-16 carbon atoms,  $\text{R}_3$  and  $\text{R}_4$  are independently of each other an alkyl group of 1-4 carbon atoms or an hydroxyalkyl group of 2-4 carbon atoms and  $\text{R}_5$  is an alkylene group of 1-4 carbon atoms, or a group



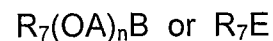
where  $\text{R}_6$  is an alkyl group of 1-3 carbon atoms,

b) a zwitterionic surfactant of the formula



where  $\text{R}_2$  is an acyl group with 18-22 carbon atoms, and  $\text{R}_3$ ,  $\text{R}_4$  and  $\text{R}_5$  have the meanings mentioned above, and

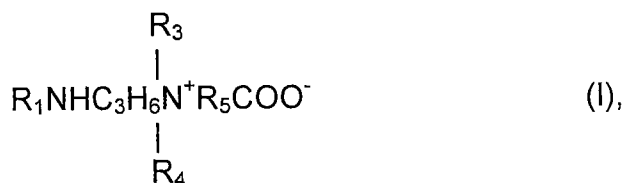
c) an anionic surfactant of the formulae



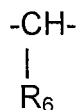
or a mixture thereof, where  $\text{R}_7$  is an aliphatic group of 8-14 carbon atoms, A is an alkylene group having 2-4 carbon atoms, n is a number from 1 to 10, B is a sulphate group  $\text{OSO}_3\text{M}$ , E is a sulphate group  $\text{OSO}_3\text{M}$  or a sulphonate group  $-\text{SO}_3\text{M}$  and M is a cationic, preferably monovalent group;

the weight of a), b) and c) being 20-95% by weight, 10-70% by weight and 1-50% by weight, respectively, based on the total amount of a), b) and c).

2. (Previously Presented) The drag reducing agent claim 1, wherein the component a) is present in an amount of 20-85% by weight.
3. (Previously Presented) The drag reducing agent of claim 1 wherein  $R_2$  contains at least 50% by weight of unsaturated acyl groups.
4. (Previously Presented) The drag reducing agent of claim 3, wherein  $R_2$  contains at least 20% by weight of unsaturated acyl groups having two or more double bonds.
5. (Previously Presented) The drag reducing agent of claim 1, wherein c) is lauryl sulphate, a lauryl (oxyethylene)<sub>n</sub> sulphate, where n is 1-3, or lauryl sulphonate.
6. (Canceled)
7. (Canceled)
8. (Currently amended) Injection water for the treatment of oil reservoirs, wherein said water contains a drag reducing agent comprising:
  - a) a zwitterionic surfactant of the formula

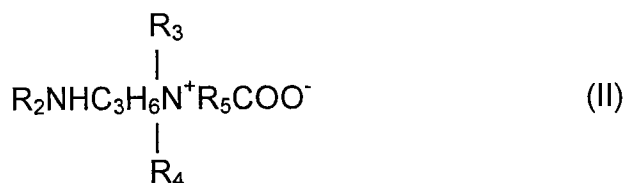


where  $R_1$  is acyl group with 12-16 carbon atoms,  $R_3$  and  $R_4$  are independently of each other an alkyl group of 1-4 carbon atoms or an hydroxyalkyl group of 2-4 carbon atoms and  $R_5$  is an alkylene group of 1-4 carbon atoms, or a group



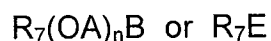
where  $R_6$  is an alkyl group of 1-3 carbon atoms,

- b) a zwitterionic surfactant of the formula



where  $\text{R}_2$  is an acyl group with 18-22 carbon atoms, and  $\text{R}_3$ ,  $\text{R}_4$  and  $\text{R}_5$  have the meanings mentioned above, and

c) an anionic surfactant of the formulae



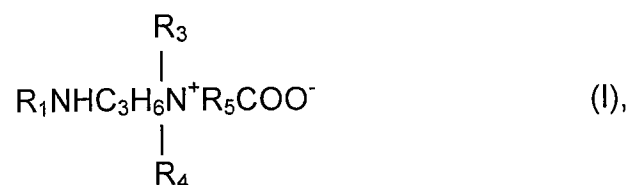
or a mixture thereof, where  $\text{R}_7$  is an aliphatic group of 8-14 carbon atoms, A is an alkylene group having 2-4 carbon atoms, n is a number from 1 to 10, B is a sulphate group  $\text{OSO}_3\text{M}$ , E is a sulphate group  $\text{OSO}_3\text{M}$  or a sulphonate group  $-\text{SO}_3\text{M}$  and M is a cationic, preferably monovalent group; wherein the weights of components a), b) and c) are 20-95% by weight, 10-70% by weight and 1-50% by weight, respectively, based on the total amount of a), b) and c), wherein the total amount of the components a), b) and c) which is from 50-400 ppm and said water in the absence of said drag reducing agent has an electrolyte content of 0.01-7% by weight.

9. (Previously Presented) Injection water according to claim 8, wherein said water contains electrolytes in an amount of 0.3-6% by weight.

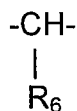
10. (Previously Presented) Injection water according to claim 8 wherein the water is sea-water or production water.

11. (Currently Amended) A new method of reducing drag in waters containing electrolytes which comprises adding to said waters containing said electrolytes at least one drag-reducing agent containing

a) a zwitterionic surfactant of the formula

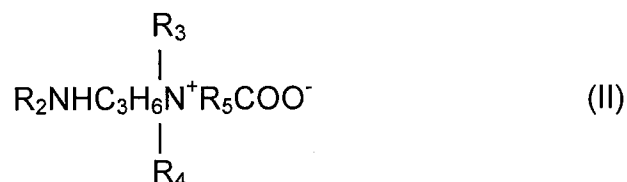


where  $R_1$  is acyl group with 12-16 carbon atoms,  $R_3$  and  $R_4$  are independently of each other an alkyl group of 1-4 carbon atoms or an hydroxyalkyl group of 2-4 carbon atoms and  $R_5$  is an alkylene group of 1-4 carbon atoms, or a group



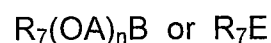
where  $R_6$  is an alkyl group of 1-3 carbon atoms,

b) a zwitterionic surfactant of the formula



where  $R_2$  is an acyl group with 18-22 carbon atoms, and  $R_3$ ,  $R_4$  and  $R_5$  have the meanings mentioned above, and

c) an anionic surfactant of the formulae



or a mixture thereof, where  $R_7$  is an aliphatic group of 8-14 carbon atoms, A is an alkylene group having 2-4 carbon atoms, n is a number from 1 to 10, B is a sulphate group  $OSO_3M$ , E is a sulphate group  $OSO_3M$  or a sulphonate group  $-SO_3M$  and M is a cationic, preferably monovalent group;

the weight of a), b) and c) being 20-95% by weight, 10-70% by weight and 1-50% by weight, respectively, based on the total amount of a), b) and c); ~~in an amount of a), b) and c) of 50-400 ppm wherein said waters containing said electrolytes have an electrolyte content from 0.01-7% by weight~~ wherein the total amount of components a), b) and c) is from 50-400 ppm and said water in the absence of said drag reducing agent has an electrolyte content of 0.01-7% by weight.

12. (Previously Presented) The new method of claim 11, wherein the component a) and b) are present in an amount of 20-85% by weight and 10-70% by weight, respectively.

13. (Previously Presented) The method of claim 11 wherein  $R_2$  contains at least 50% by weight of unsaturated acyl groups.
14. (Previously Presented) The method of claim 11 wherein  $R_2$  contains at least 20% by weight of unsaturated acyl groups having two or more double bonds.
15. (Previously Presented) The method of claim 11 wherein c) is lauryl sulphate, a lauryl (oxyethylene)<sub>n</sub> sulphate, where n is 1-3, or lauryl sulphonate.
16. (Previously Presented) The method of claim 11 wherein the water has an electrolyte content of 0.3-6% by weight.
17. (Canceled)
18. (Canceled)
19. (Previously Presented) The drag reducing agent claim 1, wherein  $R_5$  is  $CH_2$ .
20. (Previously Presented) Injection water according to claim 8, wherein  $R_5$  is  $CH_2$ .
21. (Previously Presented) The method of claim 11, wherein  $R_5$  is  $CH_2$ .

**REMARKS**

This is in response to the Notice of Non-Compliant Amendment mailed July 21, 2010. All proper status identifiers have been provided.

In the official action mailed January 8, 2010 the examiner maintained the rejection of claims 1-5 and 8-21 under 35 U.S.C. § 103(a) over Hellsten (U.S. 5,902,784). No other rejections have been applied against the pending claims.

In response to the rejection, applicants provide the following distinguishing remarks which are believed to place the present case in condition for allowance. Favorable reconsideration of the pending claims is respectfully requested.

The claim amendments herein do not raise new issues and/or require a new search. The subject matter of claims 17 and 18 have been combined into claim 8 (support also found in present claim 1) and the amendments to claim 11 have support in the various pending claims, including also claim 1. Claims 17 and 18 have been canceled. As a result, the amendments made herein are believed to place the case in prima facie condition for allowance, or they simplify the issues for Appeal.

*Should the examiner not enter the amendments herein, he is respectfully requested to clearly articulate why such amendments are not entered including but not limited to the following:*

- i. why they are deemed to raise new issues, and/or*
- ii. why a new search is required and in what areas said new search would have to be conducted, and/or*
- iii. why the amendments are not deemed to simplify the issues for Appeal, and/or*
- iv. why the amendments do not place the present case in condition for allowance.*

*These specifics are essential for applicants to evaluate the basis for the examiner's position and the next course of action for applicants in this case.*

Claim Rejections under 35 U.S.C. § 103

Applicants previous comments are repeated and incorporated herein by reference.

At page 6, line 3 of the office action the examiner states that claim 1 "requires no electrolyte". Claim 1 is directed to a drag reducing agent per se and as such, it does not contain electrolytes. The electrolytes comes from the water that is present in the process, i.e., electrolytes are relevant only after the drag reducing agent has been added to waters containing electrolyte.

At page 6, line 4 of the office action the examiner states that claim 8 does not require component (b). Claims 17 and 18 have been combined with claim 8 to overcome this comment.

In **point 9** of the Office Action (page 7) the examiner acknowledges that the claimed subject matter is novel, but not deemed to be unobvious.

The examiner also continues to allege that applicants fail to support a finding of unexpected results, stating that the claimed invention is NOT deemed to be unobvious since the prior art teaches the relationship between the acyl carbon number and the temperature of efficacy of the drag reducing agents (starting at the last two lines of page 7 and onto page 8 of the office action). Applicants respectfully submit that the examiner's stated case of obviousness must fail for at least two important reasons.

**1. Synergy is Demonstrated**

Applicants again rely on Example 1, specifically on **Test 8, 2 and A of Example 1 (see below)**. Test 8 is according to the invention, while tests 2 and A are comparative. The high upper level of 60°C reached by the combination of the betaines



used in test 2 and test A, is **not achieved** by either test 2 or test A alone, i.e., the combination of the betaines in test 2 and test A yields a synergistically high upper level and not just an additive effect.

**Test 8** is according to the present invention as claimed in the present claims, and the components are C14APB (100 ppm), C18APB (100 ppm) and C12S (20 ppm) (for a definition see example 1).

**Test 2** (comparative example) uses only C14APB (200 ppm) and C12S (30 ppm).

**Test A** (comparative example) uses only C18APB (200 ppm) and C12S (20 ppm).

In **test 8** the temperature range (14°C – 60°C) has a span of 46°C; lowest value 14°C, and highest value 60°C.

In **test 2** the temperature range (16°C – 46°C) has a span of 30°C; lowest value 16°C, and highest value 46°C.

In **test A** the temperature range (27°C – 49°C) has a span of 22°C; lowest value 27°C, and highest value 49°C.

Thus, the highest value of the temperature range in test 8 is 60°C, in test 2 it is 46°C and in test A it is 49°C. If the results of test 8 were merely additive, one would expect that the highest level of the temperature range for test 8 would only have been 49°C, not 60°C as was actually found. Similarly, the lowest value for test 8 would have been 16°C, not 14°C.

Consequently both the highest and the lowest value of the range as well as the span of the range is synergistically affected by using a combination of the products.

**2. Cited Art Does Not Teach or Suggest Synergistic Effect.**

The synergistic effect of the claimed invention clearly **could not have been foreseen** by testing the separate components. There appears to be no record or evidence in the cited art teaching or suggesting the enhanced drag reducing effect of the invention, and certainly this effect could not have been predicted from the drag reducing properties of the individual components of the claimed combination. As such, the efficacy of the claimed combination is "surprising", and persuasively rebuts the alleged case of obviousness presented by the examiner.

In summary, applicants respectfully submit that the subject rejection is improper; reconsideration and withdrawal thereof is respectfully requested. Applicants further submit that the present application is now in condition for allowance, which action is respectfully solicited.

Respectfully submitted,



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